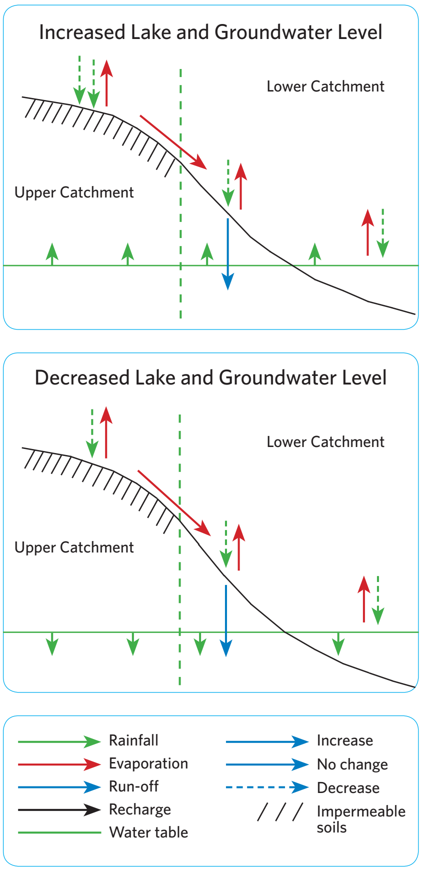
WSUP
Water & Sanitation for the Urban Poor

PRACTICE NOTE

PN#004 • MAY 2011

Climate-proofing urban WASH: a rapid assessment method

Climate change is happening, and the urban poor are extremely vulnerable to its impacts. Demand for water and sanitation services in low-income urban areas is likely to increase, while flooding and water shortages may become more frequent. Service providers need to take action now.



Predicting the hydrological impacts of climate change is often difficult: in Naivasha, rainfall is likely to decrease, but the level of the lake may rise or fall (more details overleaf).

The adaptations required to proof against long-term climate change are generally very similar to the adaptations required to proof against *short-term* climate variability. For example, in many African cities seasonal flooding already has a critical impact on water and sanitation services. So the appropriate strategies for long-term climate-proofing are often required *in any case* for moving towards better water and sanitation services. This Practice Note outlines a rapid assessment method, developed for WSUP by Cranfield University, that can be used to plan the climate-proofing of a city's water and sanitation services.

Step 1: Review impacts

Review UNDP climate brief[1] and UNFCCC National Adaptation Programme of Action,[2] along with any other relevant country- or city-level reports, to establish likely future changes in climate (precipitation, temperature, and extreme events).

Step 2: Assess vulnerabilities

Run community focus groups and interview key stakeholders including water and sanitation service providers, government departments, environmental/water regulators, academics and NGOs; interview guides are available from WSUP. Assess the current impact of extreme events, on water and sanitation and more generally (e.g. on livelihoods and health); assess the perceived sustainability of current water resource quality and quantity.

Step 3: Determine climate scenarios

Develop a set of plausible (although not necessarily equally likely) worst-case climate scenarios and assess the impact on any rivers, lakes or groundwater and specifically on recharge and run-off levels. If no quantitative data is available a conceptual model can be used. Assess for the following risks:

- increased risk of flooding
- increased groundwater recharge and a rise in groundwater level
- increased run-off with more erosion
- decreased water availability

Step 4: Determine impacts and suitable adaptations

Assess the impact of the climate scenarios and the changes to the hydrology on the existing vulnerabilities. Review the impact on:

- water and sanitation technologies and assess the resilience of each, including hydrological design methods used (which may be incorrectly based on the assumption of a static climate)
- the community and factors which affect ability to pay (e.g. food prices or employment)

Prepare adaptations and allocate them between local service providers, utilities and municipalities (see WHO and DFID's Vision 2030[3] for a comprehensive guide to adaptations and increasing resilience of technologies).

[1] *http://country-profiles.geog.ox.ac.uk*

[2] *http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php*
also
http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php

[3] *www.who.int/water_sanitation_health/publications/9789241598422_cdrom/en*

Common scenarios, common adaptations

For most African cities (except cities depending on glacier-fed rivers), the predicted future climate scenario is either:

- increased rainfall plus increased rainfall intensity or
- decreased rainfall plus increased rainfall intensity

(in some cities both scenarios are possible).

In some cases it is relatively easy to predict the impacts of these changes. In Antananarivo (Madagascar), for example, we expect increased rainfall (likely to increase run-off and raise river levels) and increased rainfall intensity (likely to cause more intense flooding from both the river and stormwater drains).

Even if the frequency of flooding does not change, the increase in river levels will increase the number of days when the drains can't empty and have to be pumped. In other cases, as in Naivasha (Kenya), prediction of impacts is more difficult. As summarised in the diagrams overleaf, rainfall is predicted to decrease and rainfall intensity and temperature to increase: but lake level may increase or decrease, depending on the relative magnitudes of the rainfall decrease and the rainfall intensity increase.

Common climate-proofing adaptations are summarised in the table below.

Impacts of increased rainfall and/or increased rainfall intensity

Impact: Flooding, causing damage to water kiosks, pipes and houses; latrines and septic tanks overflow, increasing exposure to pathogens and contaminating unimproved water supplies

Adaptations: local operators	Adaptations: water utility	Adaptations: municipality
• Community education about hygiene during floods and how to flood-proof toilets (e.g. raised latrines) • Protect boreholes against flood (e.g. raised headworks) • Chlorination of water supply during floods	• Increase infrastructure inspection during floods • Use non-revenue water reduction programmes to ensure pipes are intact • Increase water quality monitoring during floods	• Improve drainage and solid waste collection so drains are not blocked • Improve faecal sludge collection services • Land management practices to slow floods and conserve soil

Impact: Increased run-off increases sediment load in intake water and damages infrastructure

Adaptations: local operators	Adaptations: water utility	Adaptations: municipality
• Improve drainage of local infrastructures	• Increase infrastructure inspection during heavy rains	• Maintain and improve drainage • Soil conservation measures

Impacts of decreased rainfall

Impact: Lower water table leads to water scarcity for users of both piped and non-piped sources

Adaptations: local operators	Adaptations: water utility	Adaptations: municipality
• Investigate alternative supplies • Educate people about hygiene with limited water supplies	• Investigate sustainable yield of groundwater	• Engage in water allocation dialogues

Impact: Increased demand for piped supplies and lower pressures lead to long queues at kiosks

Adaptations: local operators	Adaptations: water utility	Adaptations: municipality
• Expand kiosk network into unserved areas	• Support network expansion • More storage tanks	

Impact: Decreased hydroelectricity available for pumping

Adaptations: local operators	Adaptations: water utility	Adaptations: municipality
	• Financial analysis of implications of increased power costs	• Financial analysis of implications of increased power cost

More detailed guidance on the climate proofing of urban water and sanitation services –including specific reports on Antananarivo, Lusaka and Naivasha– is available for download from the WSUP website.

***Credits**: This Practice Note was written by Tom Heath and Alison Parker, on the basis of original research by Tom Heath. Review inputs were provided by Sue Cavill, Alan Etherington, Richard Franceys, Guy Norman, Sam Parker and Patricia Schelle. Coordination: Gemma Bastin. Design: AlexMusson.com. Version 1, May 2011.*